

# FINAL REPORT

## HEALTH AND SAFETY PLAN SOIL CHARACTERIZATION

### ENTERPRISE RECOVERY SYSTEMS BYHALIA, MISSISSIPPI

10300715



Prepared for  
Enterprise Recovery Systems Site Group  
Byhalia, Mississippi

February 1994

WCC File 93B477

**Woodward-Clyde** 

Woodward-Clyde Consultants  
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Baton Rouge, Louisiana

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WOODWARD-CLYDE CONSULTANTS HEALTH AND SAFETY PLAN

1.0

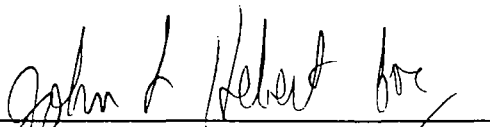
PROJECT IDENTIFICATION

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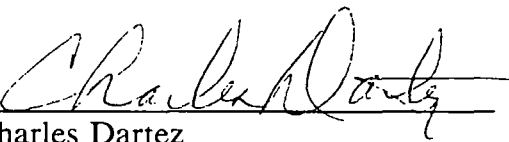
Client: Enterprise Recovery Systems Site Group  
Project: Phase I Site Characterization  
Project Number: 93B477  
Dates of Plan: February 1, 1994  
Expiration Date: December 31, 1994

1.1 HEALTH AND SAFETY PLAN APPROVALS

Client: Enterprise Recovery Systems Site Group  
Project: Phase I Site Characterization  
Project Number: 93B477

  
\_\_\_\_\_  
Charles Self, C.I.H.  
Health and Safety Officer  
Gulf Coast Operating Unit

2-1-94  
Date

  
\_\_\_\_\_  
Charles Dartez  
Project Manager

2-1-94  
Date

2.0  
**INTRODUCTION**

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This Health and Safety Plan establishes guidelines and requirements for the safety of field personnel during the field activities associated with Enterprise Recovery Systems Site Group (ERSSG) at Byhalia, Mississippi. All employees of Woodward-Clyde Consultants (WCC) involved in this project are required to abide by the provisions of this plan. They are required to read this plan and sign the attached Compliance Agreement prior to initiation of any field work.

The health and safety guidelines and requirements presented are based on a review of available information and an evaluation of potential hazards. This plan outlines the health and safety procedures and equipment required for activities at this site to minimize the potential for health risk exposures to field personnel. This plan may be modified by the Project Manager with the written approval of the Corporate Health and Safety Officer in response to additional information obtained regarding the potential hazards at the site to field investigative personnel.

This plan is prepared for the exclusive use of WCC personnel and WCC subcontractors as defined by the work activities in Section 5.0.

**KEY PERSONNEL**

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Project Manager: Charles Dartez  
Office: Baton Rouge, Louisiana  
Phone: 504/756-1416

For this project, the Project Manager has the following responsibilities:

- To see that the project is performed in a manner consistent with the WCC Health and Safety Program.
- To have an approved Health and Safety Plan prepared and properly implemented for this project.
- To provide the Business Unit Health and Safety Officer with project information related to health and safety matters and to assist the Business Unit Health and Safety Officer in the development of the Health and Safety Plan.
- To implement the Health and Safety Plan.
- To ensure compliance with the Health and Safety Plan by WCC personnel.
- To coordinate with the Business Unit Health and Safety Officer on health and safety matters.
- To review project schedules and budgets.

The Project Manager has the authority to take the following actions:

- To determine matters relating to schedule, cost, and personnel assignments on hazardous waste management projects.
- To temporarily suspend field activities, if the health and safety of personnel are endangered, pending further consideration by the Business Unit Health and Safety Officer.
- To temporarily suspend an individual from field activities for infractions of the Health and Safety Plan, pending further consideration by the Business Unit Health and Safety Officer.

Corporate Health and Safety Officer: Charles Self

Office: Lake Charles, Louisiana

Phone: 318/439-2683

The Corporate Health and Safety Officer has the following responsibilities:

- Direct the implementation of the Health and Safety Program of the operating group and provide recommendations for updating, improving, and/or modifying the program.
- Coordinate health and safety activities of the operating units in the operating group.
- Determine the need for project Health and Safety Plans.
- Review and approve Health and Safety Plans.
- Monitor implementation of Health and Safety Plans.
- Investigate and report incidents and/or accidents to the Corporate Health and Safety Administrator in Plymouth Meeting, PA.
- Monitor and implement employee health and safety training in the Gulf Coast Operating Group.
- Determine whether an accidental exposure or injury merits a change in the affected individual's work assignments and whether changes in work practices are required.
- Coordinate operating units with regard to health and safety equipment needs.

The Corporate Safety Officer has the following authorities:

- Approve or disapprove Health and Safety Plans.
- Direct operating unit Health and Safety Officers/Coordinators.
- Access project files.
- Direct changes in personnel work practices to improve health and safety of employees involved in hazardous waste management projects.
- Remove individuals from projects, if their conduct jeopardizes the health and safety of themselves or that of co-workers.
- Suspend work on any project that jeopardizes the health and safety of personnel involved.

Site Safety Officer:

Office:

Phone:

The Site Safety Officer has the following responsibilities:

- To direct health and safety activities on-site.
- To report safety-related incidents or accidents to the Project Manager and Business Unit Health and Safety Officer.
- To assist the Project Manager in all aspects of implementing the Health and Safety Plan.
- To maintain health and safety equipment on-site, as specified in the Health and Safety Plan.
- To perform health and safety activities on-site, as specified in the Health and Safety Plan, and report results to the Project Manager and the Business Unit Health and Safety Officer.

The Site Safety Officer has the authority to take the following actions:

- To temporarily suspend field activities, if the health and safety of personnel are endangered, pending further consideration by the Business Unit Health and Safety Officer.
- To temporarily suspend an individual from field activities for infractions of the Health and Safety Plan, pending further consideration by the Business Unit Health and Safety Officer.



**SITE DESCRIPTION AND HISTORY**

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The Enterprise Recovery Systems (ERS) site is located on Cayce Road in Byhalia, Mississippi. Commercial solvent recycling was performed on the site from 1978 to 1991.

Major features at the site during solvent recycling operations included:

- A combination office and warehouse building
- An above-ground tank area with three (3) storage tanks
- A second above-ground tank area with sixteen (16) storage tanks
- Two drum staging areas
- A small settling pond
- Several acres of wooded and grassy land (the site is located on a eight (8) acre parcel of land)

Based on environmental assessments of the soil and groundwater at the site from December 1989 through July 1992, the constituents of concern detected at the site include volatile compounds such as ethylbenzene, styrene, methylene chloride, toluene, trichloroethylene, xylene, acetone, methyl ethyl ketone, methyl isobutyl ketone, and 1,1,1-trichloroethane, and dichloromethane. Inorganics such as lead, chromium, and manganese were also detected.

## GENERAL DESCRIPTION OF WORK

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### 5.1 PURPOSE

This scope of work is to focus on the four to five potential problem areas identified during the 1993 EPA soil assessment. The targeting of these areas will be to define the nature and extent of soil contamination above the water table to a depth of 15 feet bls. The sampling and analytical methods utilized in the investigation will be described in the WCC Sampling and Analysis Plan for the site.

Phase I of the proposed scope of work will consist of a data/records review, development of a sampling and analysis plan, and the development of this Health and Safety Plan. Phase II will be the implementation of the Sampling and Analysis Plan, and the ensuing report documenting the field activities and sample results will comprise Phase III.

Field activities will consist of the collection and field screening of shallow soil samples and soil borings. Selected soil samples will be shipped to a laboratory for analysis after being properly manifested.

### 5.2 DESCRIPTION OF WORK ACTIVITIES

#### Soil Sampling

WCC will collect up to 60 shallow soil samples for field screening to define the \_\_\_\_\_ limits of the previously identified areas. Following this task, shallow soil borings will be installed within or near the identified areas. These borings will extend no deeper than the first shallow groundwater or to a depth of 15 feet below land surface (bls), whichever is encountered first. Up to 15 shallow soil borings may be drilled during this phase of work and up to 30 samples may be collected for laboratory analysis in accordance with EPA SW846 Method 8240 for volatile organics.

In addition to the sampling described above, WCC will collect and field screen up to 20 additional soil samples from on-site locations selected by the EPA. These samples will be field screened in the same manner as described above.

Any work other than the work described above will require an addendum to this Health and Safety Plan.

**6.0**  
**HAZARD ASSESSMENT**

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Potential hazards at the site must be identified and addressed to ensure the safety of personnel working on the site. The following potential hazards have been identified and addressed:

- Physical hazards
- Biological hazards
  - Insects
  - Snakes
  - Poison ivy/poison oak
- Chemical hazards

### **6.1 PHYSICAL HAZARDS**

There is no risk of physical injury resulting from contact with heavy equipment at the site. Use of steel toe boots and hard hats will be required when in the vicinity of heavy equipment, if it is brought to the site. Personnel should be cognizant of the fact that when protective equipment such as respirators, gloves, and protective clothing is worn, visibility, hearing and manual dexterity are impaired.

Always use proper procedures when lifting even relatively light objects. Before lifting, approach the object and bend at the knees, keeping your back vertical and unarched. Obtain a firm footing and grasp the object firmly with both hands. Stand slowly and squarely while keeping your back vertical and unarched. Perform the lifting with the muscles in your legs, not your lower back.

When hand augering, be sure that the feet are in a stable position and on a non slick surface. When possible use two persons. Additionally, a twisting motion with the upper body should be minimized when hand augering.

### **6.2 BIOLOGICAL HAZARDS**

Mosquitos and ticks may be prevalent at the site. Field personnel are encouraged if warranted to use insect repellents before venturing on-site and to check for ticks when showering. Poisonous snakes may also be present at the site. To avoid snake bites, personnel should check for snakes before walking through grassy or debris-strewn areas. Also, field personnel should always wear proper foot wear when working on-site to protect feet and lower leg areas. Poison ivy and poison oak are potential skin irritant sources which may be encountered when clearing brush. Tape long sleeves to work

gloves, and tape pant legs to boots. This will provide protection from contacting these plants. If contact with either of these plants is suspected, the affected area should be cleansed immediately with soap and water. Further complications, such as development of a rash/blister formation, fever, etc. may require medical attention. Fire ant mounds may also be present at the site. Field personnel should avoid direct contact with these mounds. A first aid kit with insect bite treatment will be available for use at the site.

### **6.3 CHEMICAL HAZARDS**

Chemical exposure resulting in personal injury can occur through four routes: inhalation, ingestion, skin contact and eye contact. To prevent ingestion of chemicals, eating, smoking, and drinking are prohibited on the site. In addition, all field personnel will be required to decontaminate themselves before leaving the site.

Chemically resistant clothing, eye protection and foot wear must be worn by all workers who could be exposed to ethylbenzene, styrene, methylene chloride, toluene, trichloroethylene, xylene, acetone, methyl ethyl ketone, methyl isobutyl ketone, 1,1 dichloroethane, 1,1,1 trichloroethane, dichloromethane, lead, chromium, and manganese. Anyone experiencing skin or eye irritation should report immediately to the Site Safety Officer for attention. The Site Safety Officer should take steps to see that similar exposures do not occur.

The risk of chemical inhalation at the site is considered to be of high probability due to the high vapor pressure of the identified chemicals. However, personnel performing field operations should position themselves upwind during field activity to minimize their exposure to these solvents and wear safety glasses to protect against eye contact. Potential hazards may be minimized by protecting against exposures to toxic materials by utilizing appropriate personal protective equipment and careful monitoring of the breathing zones and working areas. See Attachment 1 for Material Safety Data Sheets (MSDS).

**GENERAL HEALTH AND SAFETY REQUIREMENTS**

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**7.1 PERSONAL PROTECTIVE EQUIPMENT**

Personal protective equipment required to prevent contact with known or anticipated chemical hazards has been divided into four categories by the United States Environmental Protection Agency (USEPA), Levels A, B, C and D, according to the degree of protection afforded. A description of the categories expected to be utilized during this project are provided below:

All personnel engaged in activity at the site will be provided with the following basic personnel protective equipment:

- Safety glasses with side shields
- Hard hat
- Boots, butyl or PVC
- Chemical splash goggles

Personnel shall wear the first three items at all times except in designated locations, and shall have the goggles readily available at all times.

Level B protection should be employed when the highest level of respiratory protection is needed and a moderate level of skin protection is required. The equipment for Level B protection includes:

- Pressure-demand, self-contained breathing apparatus (SCBA) or pressure-demand supplied air respirator with escape SCBA (including five-minute bottle)(MSHA/NIOSH-approved)
- Chemical-resistant clothing with hood; disposable Tyvek Saranex, polycoated or equal
- Gloves (outer), chemical-resistant; Pioneer A-14 (Nitrile)
- Gloves (inner), chemical-resistant
- Boots (rubber-type), chemical-resistant
- Two-way, intrinsically-safe radio

Level C protection is selected when the types of airborne substance(s) is known, the concentration(s) is measured and the criteria for using air purifying respirators are met. Level C protective equipment include:

- Full-face, air-purifying, cartridge-equipped (organic vapor/acid gas and particulate) respirator (MSHA/NIOSH-approved)
- Chemical-resistant clothing with hood; disposable Tyvek Saranex, polycoated or equal
- Gloves (outer), chemical-resistant; Pioneer A-14 (Nitrile)

- Gloves (inner), chemical-resistant; Playtex PVC or equal
- Boots, chemical-resistant; butyl or PVC

Modified Level D provides for dermal protection, but no respiratory protection.

- Chemical-resistant clothing; Tyvek Saranex, polycoated or equal
- Gloves, chemical-resistant; Pioneer A-14 (Nitrile)
- Gloves, inner-latex or equal
- Face shields where splash hazards are present
- Boots (rubber type), chemical-resistant
- Safety glasses with side shields
- Hard hat
- Ear plugs
- Full face air purifying respirators equipped with organic vapor/HEPA cartridges are required when decontaminating equipment involving steam cleaning or high pressure washers.

Level D protection includes:

- Gloves (outer), chemical-resistant; Pioneer A-14 (Nitrile)
- Gloves (inner), chemical-resistant
- Boots (rubber type), chemical-resistant

The protection levels which have been selected are based on the hazard assessment (Section 6.0) and may be revised based on field measurements during construction. Field activities for this project, require modified Level D protection.

Coveralls, boots, hard hats and safety glasses or goggles must be worn by all personnel while on-site. Inner latex gloves with outer nitrile gloves will be worn during all sampling activities when handling samples and waste. Ear plugs must be worn in areas with elevated noise levels.

Tyvek coveralls will be discarded after each use or when they become worn or punctured. Suit materials offer resistant to all known or anticipated chemicals at the site. If the disposable protective suits appear to be deteriorating under chemical action, the Site Safety Officer should be notified. In addition to the personal protective equipment listed above, general safety equipment available for use will include a first aid kit, portable eye wash and fire extinguisher. Modified Level D provides for dermal protection, but no respiratory protection. When respiration protection is needed, protection should be upgraded to Level C.

## **7.2 WORK ZONES**

During activities conducted in Modified Level D personal protective equipment the setup of work zones as defined by the U.S. EPA will be required. Management of this project shall be conducted in such a manner which will restrict access to the job site by unauthorized personnel. If contaminated soils are encountered, the Site Safety Officer

will make provisions for a personnel decontamination area. This area shall be so designed with entry and exit points clearly marked. A personnel contamination reduction zone (CRZ), which will provide a transition zone between the contaminated and clean areas, will be setup by the Site Safety Officer.

A work zone will be established around the boring and drilling equipment for each boring activity.

One additional work zone will be set up for decontaminating equipment.

### **7.3 DECONTAMINATION PROCEDURES**

#### **7.3.1 Personnel Decontamination**

Adequate personnel decontamination stations will be established to remove contaminants from the field crew's personal protective equipment or hands. Each site characterization project will have a minimum of one personnel decontamination station, strategically located in the work area or in the contamination reduction zone, if applicable. The decontamination station will have at least the following items:

- An adequate-sized plastic sheet for flooring
- Boot wash equipment
  - Water/liquinox solution container
  - Rinse water container
  - Long-handed plastic brush
- Waste container (for disposal protective equipment, tape, etc.)
- Hand wash equipment
- Water/liquinox solution container
- Rinse water container
- Paper towels

Personnel will be decontaminated by the following procedure:

- Boot wash/rinse utilizing brush for contamination removal in waste container
- Removal of disposal suit
- Removal of gloves
- Hand wash/rinse/drying

#### **7.3.2 Sampling Equipment Decontamination**

Sampling equipment used to collect the shallow soil samples (e.g., hand augers, bowls) will be decontaminated prior to and subsequent to sample collection. Decontamination of sampling equipment will occur in the exclusion zone. All sampling equipment will be cleaned between each sample location or at intervals as described below:

- Washing in a phosphate-free detergent solution.
- Rinsing with tap water.
- Rinsing with deionized water.
- Rinsing twice with methanol
- Rinsing with organic-free water and allow to air dry as long as possible.
- If organic-free water is not available, allow equipment to air dry as long as possible. Do not rinse with deionized or distilled water.

After decontamination, the sampling equipment will be wrapped in aluminum foil for protection until subsequent use.

### **7.3.3 Disposal of Waste**

All waste from decontamination procedures (e.g., disposable suits, tape, wash/rinse solutions, gloves, etc.) will be contained on-site in 55-gallon drums. Soil samples and soil cuttings collected on-site in conjunction with the assessment activities will also be contained on-site in 55 gallon drums and labelled for proper disposal.

## **7.4 MEDICAL EXAMINATION**

Before beginning any of the field or laboratory activities described in Section 5.0, all WCC personnel must take an annual, WCC-approved medical examination as part of WCC's medical surveillance program.

## **7.5 SAFETY TRAINING DOCUMENTATION**

Prior to commencing any of the field activities defined in Section 5.0, all WCC personnel and subcontractors working on-site will supply certificate or equivalent, attesting to completing 40 hours of training as required by OSHA, in 29 CFR 1910.120, to the Site Safety Officer. Site supervisors will be required to supply documentation indicating that an additional 8 hours of training has been completed. Escorted visitors may be allowed in a defined area without 40 hours training at the discretion of the WCC Site Safety Officer and the WCC project supervisor.

Documentation concerning respirator fit testing, in accordance with OSHA, 29 CFR 1910.134 shall be required of any WCC employee wearing a respirator.

Site specific training will address:

- General site safety (slips, trips, falls)
- Description of site activities
- Required personal protective equipment
- Decontamination
- Work zone procedures (if necessary)
- Emergency procedures
- Chemical hazards present or those expected to be present. MSDS's will be provided for identification of chemicals. At the site safety plan



review meeting, the MSDS's will be reviewed and all workers are expected to understand the hazards of the listed chemicals.

A morning meeting will be held by the Site Safety Officer to address hazards associated with the day's planned activities. The meeting will be documented on the form found in Attachment 1.

#### **7.6 COMPLIANCE AGREEMENT**

The Project Manager and the Site Safety Officer will hold meetings with all WCC field personnel and subcontractor personnel before work begins. During the meeting, all personnel will be provided with a copy of this safety plan; the plan will be reviewed and discussed and any questions will be answered. Signed Compliance Agreement Forms (Section 12.0 of this Health and Safety Plan) will be collected by the Site Safety Officer and filed by the Project Manager. Only individuals who have submitted signed forms will be allowed to work on the site.

#### **7.7 PROJECT MANAGER NOTIFICATION**

All assigned field personnel must be approved by the Project Manager or his designated representative before working on the site. The "buddy system" will be used, which means that at least two members of the field crew must be on the site whenever work is performed. Personnel must be in visual contact with each other or carry two-way radios at all times.

#### **7.8 PROJECT SAFETY LOG**

A project safety log will be used to record the names, entry and exit dates and times of all WCC and subcontractor personnel and of project site visitors; accidents, injuries, and illnesses; incidence of safety infractions by field personnel; air quality and personal exposure monitoring data; and other information related to safety matters. All accidents, illnesses or other incidents shall be reported immediately to the WCC Project Manager, and the Safety Coordinator and subsequently documented for filing on the HS-502 Incident Report Form attached as Attachment 2.

#### **7.9 PROHIBITIONS**

- Smoking, eating, drinking, chewing gum or tobacco, storing food or food containers shall not be permitted on the work site. Good personal hygiene should be practiced by field personnel to avoid ingestion of contaminants or spread of contaminated materials.
- Ignition of flammable liquids within, on, or through improvised heating devices or space heaters.

- Approach or entry into areas or spaces where toxic or explosive concentrations of gases or dust may exist without proper equipment available to enable safe entry.
- Conduct of on-site operations without proper notification and communication.

#### **7.10 SITE SAFETY MEETINGS**

Daily safety meetings will be held by the Site Safety Officer during all site characterization activities to review and plan the specific health and safety aspects of work scheduled for that day. Attachment 3 contains a safety officer pre-work checklist and Attachment 4 contains a site safety meeting report form which should be reviewed daily or as often as necessary.

## AIR QUALITY MONITORING

The primary goal of on-site air quality monitoring will be compliance with the specified contaminant action levels. The secondary goal will be documentation of personal exposures as required by OSHA 1910.120.

## 8.1 AIR QUALITY SURVEY

An OVA shall be used while conducting sampling to characterize volatile organic compounds (VOCs) on-site. Worker breathing zone monitoring for VOCs will be conducted periodically throughout sampling activities using the organic vapor analyzer (OVA). The OVA readings will be used in conjunction with information about known or suspected contaminants at the site to determine what level of protection is required. In the OVA survey mode, the following guidelines will be used:

TABLE 8-1			
INSTRUMENTS USED	CONTAMINANTS MONITORED	ACTION LEVEL (ppm above background)	MINIMUM LEVEL OF PROTECTION
Organic Vapor Analyzer	Organic Vapors	> 50	Evacuate
		1 - 50	C
		< 1	D

## **8.2 PERSONNEL EXPOSURE MONITORING**

The OSHA regulations for Hazardous Waste Workers (1910.120) states in Section (h) that, "Those closest to the source of contaminant generation, shall receive personal air monitoring sufficient to characterize employee exposure."

During boring activities at the site, personnel exposure monitoring will be performed utilizing an OVA. The OVA Action levels for this monitoring are listed listed on Table 8-1.

**LABORATORY CONSIDERATIONS**

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**9.1 ANALYTICAL LABORATORY**

Analysis of all samples from the site will be handled by an approved laboratory that has been selected by WCC. WCC performs a detailed audit on all laboratories used. The analytical laboratory will be notified if samples are hazardous.

## EMERGENCIES/ACCIDENTS

The directions to the hospital are as follows:

Travel North on Cayce Road to Highway 72. Turn left on Highway 72 and travel North to Poplar Avenue (Memphis, Tennessee). Turn left on Poplar Avenue, travel approximately ten miles, hospital is on the left (7691 Poplar Avenue).

The list of emergency services must either be posted on-site or carried by all field personnel. Attachment 5 contains the following emergency information and directions to the hospital for posting purposes.

Emergency Service	Location	Telephone
Emergency Number	Holly Springs, Mississippi	601-851-7600
Fire Department	Holly Springs, Mississippi	601-851-7600
Police Department	Holly Springs, Mississippi	601-851-7600
Ambulance	Holly Springs, Mississippi	601-851-7600
Hospital	Memphis, Tennessee	901-754-6418
Poison Control Center	Holly Springs, Mississippi	601-851-7600
WCC Physician	Greaney Medical, Inc.	714-535-8221

Illness, injuries, and accidents that might occur must be attended to immediately in the following manner:

- Remove the injured or exposed person(s) from immediate danger.
- Render FIRST AID if necessary. Decontaminate affected personnel, if necessary.
- Report the accident to the Health and Safety Officer immediately. Form HS-502 (Attachment 2) must be completed within 24 hours of any accident and forwarded to the Corporate Health and Safety Officer.
- Develop procedures, in accordance with the Health and Safety Officer, Site Safety Officer, and Project Manager to prevent a recurrence.

**PERSONNEL ASSIGNMENTS**

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**11.1 PROJECT PERSONNEL**

WCC personnel authorized to work on this project and enter the site are:

Project Manager	Charles Dartez
Corporate Health and Safety Officer	Charles Self
Assistant Project Manager	Andy Eversull
Site Manager	
Site Safety Officer	
Sampling Personnel	James Rayburn
	Scott Hassler
	Steve Krul
	Nelson Morvant
	Victor Perez

**11.2 PROJECT SAFETY PERSONNEL**

Personnel responsible for implementing this Safety Plan are the Project Manager and Site Safety Officer. Specific responsibilities and authority for all accountable WCC personnel are listed in Section 3.0 of this plan.

**SAFETY PLAN COMPLIANCE AGREEMENT**

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I, \_\_\_\_\_ (print name), have received a copy of the Safety Plan for Enterprise Recovery Systems Site of Byhalia, Mississippi. I have read the plan, understand it, and agree to comply with all of its provisions. I understand that I could be prohibited from working on the project for violating any of the safety requirements specified in the plan.

Signed:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Firm: \_\_\_\_\_



**ATTACHMENT 1**

**MATERIAL SAFETY DATA SHEETS**



# Material Safety Data Sheet

from Genium's Reference Collection  
Genium Publishing Corporation  
1145 Catalyn Street  
Schenectady, NY 12303-1836 USA  
(518) 377-8855



GENIUM PUBLISHING CORP.

No. 300

ACETONE

(Revision E)

Issued: September 1985

Revised: November 1988

## SECTION 1. MATERIAL IDENTIFICATION

27

Material Name: ACETONE

Description (Origin/Uses): Used as a solvent for fats, oils, waxes, resins, rubber, plastics, varnishes, and rubber cements; also used in the manufacture of methyl isobutyl ketone, mesityl oxide, acetic acid, diacetone alcohol, chloroform, iodoform, bromoform, explosives, rayon, photographic films, and isoprene. Used to store acetylene gas. Widely used in the chemical process industry (CPI).

Other Designations: Dimethylformaldehyde; Dimethylketal; Dimethyl Ketone; Ketone Propane;  
Pyroacetic Acid; Pyroacetic Ether;  $C_3H_6O$ ; CAS No. 0067-64-1

Manufacturer: Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek*  
Buyers' Guide (Genium ref. 73) for a list of suppliers.



HMIS

H	1	R	1
F	3	I	1
R	0	S	2
PPG*		K	4

\*See sect. 8

## SECTION 2. INGREDIENTS AND HAZARDS

%

## EXPOSURE LIMITS

Acetone, CAS No. 0067-64-1

Ca 100

OSHA PELs

8-Hr TWA: 750 ppm, 1800 mg/m<sup>3</sup>

STEL: 1000 ppm, 2400 mg/m<sup>3</sup>

ACGIH TLVs, 1988-89

TLV-TWA: 750 ppm, 1780 mg/m<sup>3</sup>

TVL-STEL: 1000 ppm, 2375 mg/m<sup>3</sup>

Toxicity Data\*

Man, Inhalation,  $TD_{Lo}$ : 440 µg/m<sup>3</sup> (6 Mins)

Man, Inhalation,  $TD_{Lo}$ : 10 mg/m<sup>3</sup> (6 Hrs)

\*See NIOSH, RTECS (AL3150000), for additional data with references to reproductive, mutagenic, and irritative effects.

## SECTION 3. PHYSICAL DATA

Boiling Point: 134°F (56°C)

Melting Point: -137°F (-94°C)

Vapor Density (Air = 1): 2

Vapor Pressure: 180 Torr at 68°F (20°C)

Evaporation Rate: Faster than That of *n*-Butyl Acetate

Molecular Weight: 58 Grams/Mole

Solubility in Water (%): Complete

Specific Gravity ( $H_2O = 1$ ): 0.778 at 77°F (25°C)

% Volatile by Volume: 100

Appearance and Odor: A clear, colorless, highly flammable, volatile liquid with a characteristic, pleasant, sweetish odor.

## SECTION 4. FIRE AND EXPLOSION DATA

Flash Point: 1.4°F (-17°C) CC

Autoignition Temperature: 869°F (465°C)

LEL: 2.9% v/v

UEL: 12.8% v/v

Extinguishing Media: Use "alcohol" foam, dry chemical, or carbon dioxide. Use a blanketing effect to smother flames. Use water spray to reduce the rate of burning and to cool containers. Water will probably not be effective in directly extinguishing an acetone fire.

Unusual Fire or Explosion Hazards: Acetone vapor is heavier than air and may travel a considerable distance to a low-lying source of ignition and flash back.

Special Fire-fighting Procedures: Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

## SECTION 5. REACTIVITY DATA

Stability/Polymerization: Acetone is stable in closed containers during routine operations. Hazardous polymerization cannot occur.

Chemical Incompatibilities: Acetone can react dangerously with strong oxidizing agents such as nitrates, perchlorates, permanganates, and concentrated sulfuric acid; chromic anhydride; chromyl chloride; hydrogen peroxide; hexachloromelamine; nitrosyl chloride; permono-sulfuric acid; mixtures of sulfuric acid and nitric acid; mixtures of nitric acid and acetic acid; and potassium *tert*-butoxide.

Conditions to Avoid: Do not expose acetone to sources of ignition and incompatible chemicals.

Hazardous Products of Decomposition: Carbon monoxide and carbon dioxide can be produced during acetone fires.

**SECTION 6. HEALTH HAZARD INFORMATION**

**Carcinogenicity:** Acetone is not listed as a carcinogen by the NTP, IARC, or OSHA.

**Summary of Risks:** Inhalation of high concentrations of acetone vapor can cause dryness of the mouth and throat; dizziness, nausea, incoordination, slurred speech, drowsiness, and, in severe exposures, coma. Inhalation of small quantities of acetone vapor for an extended period causes irritation of the respiratory tract, coughing, and headache. Prolonged or repeated skin contact with acetone has a defatting effect causing dryness, irritation, and mild dermatitis. Under routine operating conditions the amount of acetone absorbed through the skin is small. Ingestion of acetone may cause irritation of the gastrointestinal tract and narcosis. Acetone acts primarily as a depressant to the central nervous system (CNS) when exposures are severe or prolonged. **Medical Conditions Aggravated by Long-Term Exposure:** None reported. **Target Organs:** Skin, eyes, respiratory system, and CNS. **Primary Entry:** Inhalation, skin contact. **Acute Effects:** See Summary of Risks, above. **Chronic Effects:** None reported. **FIRST AID:** **Eyes.** Immediately flush eyes, including under the eyelids, gently but thoroughly with flooding amounts of running water for at least 15 minutes. **Skin.** Rinse the affected area with flooding amounts of water, then wash it with soap and water. **Inhalation.** Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have qualified medical personnel administer oxygen as required. Monitor the exposed person for symptoms of depression of the CNS such as incoordination and drowsiness. **Ingestion.** Unlikely.\* If a small amount is ingested, dilute it slowly with 1 to 2 glasses of water or milk. **Get medical help (in plant, paramedic, community) for all exposures.** Seek prompt medical assistance for further treatment, observation, and support after first aid. \***Note to Physician:** Treatment for accidental ingestion of a small amount of acetone is unnecessary. If a large amount has been ingested, administer a charcoal slurry, either aqueous or mixed with a saline cathartic or sorbital.

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

**Spill/Leak:** Notify safety personnel, evacuate unnecessary personnel, eliminate all sources of ignition immediately, and provide adequate ventilation. Cleanup personnel need protection against this liquid's contact with skin or eyes as well as inhalation of its vapor (see sect. 8). Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways. **Waste Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations. Consider saving the waste hydrochloric acid for use as a neutralizing agent during cleanup operations of basic materials.

**OSHA Designations**

Listed as an Air Contaminant (29 CFR 1910.1000 Subpart Z).

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, No. U002

CERCLA Hazardous Substance, Reportable Quantity: 5000 lbs (2270 kg), per the Resource Conservation and Recovery Act, § 3001.

**SECTION 8. SPECIAL PROTECTION INFORMATION**

**Goggles:** Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). **Respirator:** Use a NIOSH-approved respirator per Genium reference 88 for the maximum-use concentrations and/or the exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine operations (spills or cleaning reactor vessels and storage tanks), wear an SCBA. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious butyl or natural rubber gloves, boots, aprons, and gauntlets, etc., to prevent prolonged or repeated contact with this material. **Ventilation:** Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of acetone below the OSHA PEL standard cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of the contaminant into the general work area by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations. **Safety Stations:** Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work areas. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from your shoes and equipment. **Other:** Automatic sprinkler systems for fire protection are desirable in work areas. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material. Keep it off your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Do not inhale acetone vapor.

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

**Storage/Segregation:** Store acetone in closed containers (carbon steel is recommended) in a cool, dry, well-ventilated area away from sources of ignition and strong oxidizers. Protect containers from physical damage. **Engineering Controls:** Make sure all engineering systems (production, transportation) are of maximum explosion-proof design. Electrically ground and bond all containers and pipelines, etc., used in shipping, transferring, reacting, production, and sampling operations to prevent generating static sparks. **Other Precautions:** Use labeled safety cans when handling small amounts of acetone. Acetone presents a dangerous fire hazard; perform all work operations involving it carefully and in a way that will prevent exposing the liquid or its vapor to sources of ignition.

**Transportation Data (49 CFR 172.101-2)**

DOT Shipping Name: Acetone

DOT Hazard Class: Flammable Liquid

ID No. UN1090

DOT Label: Flammable Liquid

IMO Hazard Class: 3.1

IMO Label: Flammable Liquid

IMDG Packaging Group: II

**References:** 1, 26, 38, 84-94, 100, 116, 117, 120, 122.

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Prepared by PJ Igoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: MJ Hardies, MD

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Ethyl benzene  
A. Synonyms: Phenylethane, ethylbenzol  
B. CAS #: 100-41-6

II. Physical Characteristics

A. ☒ Liquid ☐ Solid ☐ Powder ☒ Gas  
B. Color Colorless  
C. Odor Aromatic  
D. LEL 1.0 % Flash Pt. 59°F  
E. Boiling Point 277 °F Melting Point 139°F  
Ionization Potential 8.75 eV  
F. Other \_\_\_\_\_

III. Recommended Air Purifying Cartridge:

☐ Dusts, Fumes, Mists ☐ Acid Gases  
☒ Organic Vapors ☐ Pesticides  
☐ HEPA ☐ Air Purifying is Inappropriate  
☐ Ammonia/Amines ☐ Other \_\_\_\_\_

IV. Health Hazards Data

A. Routes of Entry: ☒ Inhalation ☐ Skin Absorption  
☐ Ingestion  
B. OSHA Listed Carcinogens: ☒ No ☐ Suspect ☐ Yes  
C. Sensitizer: ☐ No ☐ No Data ☒ Suspect ☐ Yes  
D. Acute Toxicity:  
Eye Contact Irritant, lacrimation immediate and severe at high levels  
Skin Contact Dermatitis  
Inhalation Headaches, dizziness, sense of constriction of chest, nose and throat irritant, vertigo  
E. Chronic Toxicity:  
Target Organs Eyes, upper respiratory system, skin, CNS  
Long-Term Effects Narcosis, coma

V. Exposure Limits

A. OSHA PEL 100 ppm (435 mg/m<sup>3</sup>) TWA  
B. ACGIH TLV 100 ppm(TWA)  
C. IDLH 2000 ppm TWA  
D. NIOSH REL  
E. STEL 125 ppm (545 mg/m<sup>3</sup>) TWA

VI. Other Pertinent Information/Special Precautions:

The TLV established to prevent eye irritation (1977)

# Material Safety Data Sheet

from Genium's Reference Collection  
Genium Publishing Corporation  
1145 Catalyn Street  
Schenectady, NY 12303-1836 USA  
(518) 377-8855



GENIUM PUBLISHING CORP.

No. 310  
METHYLENE CHLORIDE  
(Revision F)

Issued: September 1985  
Revised: November 1988

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## SECTION 1. MATERIAL IDENTIFICATION

**Material Name:** METHYLENE CHLORIDE

**Description (Origin/Uses):** Used widely in paint removers, as a solvent for plastics, as a degreasing agent, in propellant mixtures for aerosol sprays, and as a blowing agent in foams.

**Other Designations:** Dichloromethane; Freon 30<sup>®</sup>; Methane Dichloride; Methylene Bichloride; Methylene Dichloride; CH<sub>2</sub>Cl<sub>2</sub>; CAS No. 0075-09-2

**Manufacturer:** Contact your supplier or distributor. Consult the latest edition of the *Chemicalweek Buyers' Guide* (Genium ref. 73) for a list of suppliers.

HMIS

H 2

R 1

NFPA

F 1

I 3

R 0

S 3

PPG\*

K 1

\*See sect. 8



## SECTION 2. INGREDIENTS AND HAZARDS/EXPOSURE LIMITS

Methylene Chloride, ca 100%

### OSHA PEL

8-Hour TWA: 500 ppm

Ceiling: 1000 ppm Acceptable Maximum Peak  
above the Ceiling: 2000 ppm for 5 Minutes in  
Any 2-Hour Period

### ACGIH TLV, 1988-89

TLV-TWA: 50 ppm, 175 mg/m<sup>3</sup>  
(Adopted 1988-89)

### Toxicity Data\*

Rat, Oral, LD<sub>50</sub>: 2136 mg/kg

Human, Inhalation, TC<sub>Lo</sub>: 500 ppm (8 Hours)

\*See NIOSH, RTECS (PA8050000), for additional data with references to irritative, reproductive, mutagenic, and tumorigenic effects.

## SECTION 3. PHYSICAL DATA

**Boiling Point:** 103.55°F (39.75°C) at 76 Torrs

**Melting Point:** -142°F (-96.7°C)

**Vapor Density (Air = 1):** 2.9

**Vapor Pressure:** 440 Torrs at 77°F (25°C)

**Molecular Weight:** 84.94 Grams/Mole

**Solubility in Water (%):** 1% by Weight

**Specific Gravity (H<sub>2</sub>O = 1):** 1.3255 at 68°F (20°C)

**% Volatile by Volume:** Ca 100

**Appearance and Odor:** A clear, colorless, volatile liquid; distinctive, penetrating, ethereal odor. The odor will not serve as a useful warning property because concentrations of 100 ppm are not easily perceptible. Most persons can detect this odor at above 300 ppm.

## SECTION 4. FIRE AND EXPLOSION DATA

**Flash Point\***

**Autoignition Temperature:** 1033°F (556°C)

**LEL:** 12% v/v

**UEL:** 19% v/v

**Extinguishing Media:** \*Methylene chloride is not flammable under ordinary conditions. However, flammable vapor-air mixtures can form at approximately 212°F (100°C). Use water spray to cool fire-exposed containers and to flush spills away from exposures. Use extinguishing agents that will put out the surrounding fire. **Unusual Fire or Explosion Hazards:** Methylene chloride vapor is heavier than air and may collect and concentrate in low-lying, confined spaces. The high vapor pressure of methylene chloride means that when it is spilled, its vapor concentration in air can increase rapidly. If this vapor is heated, an explosion hazard is associated with the vapor-air mixture. Containers of this material may rupture violently if they are involved in fires. **Special Fire-fighting Procedures:** Wear a self-contained breathing apparatus (SCBA) with a full facepiece operated in the pressure-demand or positive-pressure mode.

## SECTION 5. REACTIVITY DATA

**Stability/Polymerization:** Methylene chloride is stable in closed containers during routine operations. Hazardous polymerization cannot occur. **Chemical Incompatibilities:** Methylene chloride can react dangerously with nitrogen tetroxide, liquid oxygen, potassium, sodium, sodium-potassium alloys, lithium, potassium hydroxide with N-methyl-N-nitroso urea, potassium *t*-butoxide, and finely powdered aluminum and magnesium. **Conditions to Avoid:** Avoid all exposure to sources of ignition, heat, and incompatible chemicals. Prolonged exposure to water may cause hydrolysis to highly corrosive hydrochloric acid when the temperature is above 140°F (60°C). In oxygen-enriched atmospheres or when heated (>212°F [100°C]), methylene chloride vapor can be readily ignited. **Hazardous Products of Decomposition:** Exposure to high temperature (from open flame, hot surfaces, uninsulated steam lines, welding arcs, etc.) can produce toxic and corrosive thermal-oxidative products of decomposition such as hydrogen chloride, carbon monoxide, and even small quantities of phosgene gas, which is extremely poisonous.

## SECTION 6. HEALTH HAZARD INFORMATION

**Carcinogenicity:** Methylene chloride is listed as a suspected human carcinogen by the ACGIH (which classifies it as a group A2 carcinogen). **Summary of Risks:** Accidental contact of liquid methylene chloride with skin or eyes causes painful irritation and possible burns if not promptly removed. Exposure by way of contaminated gloves, clothing, or paint remover formulations can produce these same irritant effects. Long-term exposure to mild or moderate doses of methylene chloride may cause a delayed (24 to 48 hours) onset of dizziness, headache, mental confusion, slurred speech, double vision, and sleeplessness. Medical recovery can be slow. Overexposure to methylene chloride can cause elevated levels of carboxy hemoglobin in the blood (this same effect results from overexposure to carbon monoxide). **Medical Conditions Aggravated by Long-Term Exposure:** None reported. **Target Organs:** Skin, eyes, respiratory system, CNS, liver, kidneys, and blood. **Primary Entry:** Inhalation, skin contact/absorption. **Acute Effects:** Headache, giddiness, stupor, irritability, fatigue, tingling in the limbs, and narcosis that is not usually fatal if the exposure is terminated before anesthetic death occurs. **Chronic Effects:** The ACGIH classification of this material as a suspected human carcinogen implies that cancer is a possible effect of chronic exposure to methylene chloride. **FIRST AID:** Eyes. Immediately flush eyes, including under the eyelids, gently but thoroughly with

**SECTION 6. HEALTH HAZARD INFORMATION, cont.**

flooding amounts of running water for at least 15 minutes. **Skin.** Rinse the affected area with flooding amounts of water and then wash it with soap and water. **Inhalation.** Remove the exposed person to fresh air; restore and/or support his or her breathing as needed. Have qualified medical personnel administer oxygen as required. **Note to Attending Physician:** Do not administer adrenalin. **Ingestion.** Unlikely. Should this type of exposure occur, do not induce vomiting because of the danger of aspiration. If spontaneous vomiting should occur, position the exposed person's head below his or her trunk to resist aspiration. **Get medical help (in plant, paramedic, community) for all exposures.** Seek prompt medical assistance for further treatment, observation, and support after first aid. **Note to Physician:** Absorbed methylene chloride is stored in body fat and metabolizes to carbon monoxide. This produced carbon monoxide increases and sustains carboxyhemoglobin levels in the blood, which concomitantly reduces the oxygen-carrying capacity of the blood. NIOSH advises preplacement and annual medical exams that emphasize liver, kidney, eye, skin, CNS, and respiratory system functions and a complete blood count. Simultaneous exposure to tobacco smoke, alcohol, and carbon monoxide, along with heavy manual labor, increases the body burden of a worker as well as the toxic hazards of the methylene chloride. In significant exposures, serum methylene chloride levels are of no clinical importance. Neurologic and hepatic status as well as carboxy hemoglobin should be monitored.

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

**Spill/Leak:** Notify safety personnel, evacuate unnecessary personnel, eliminate all sources of ignition immediately, and provide adequate explosion-proof ventilation. Cleanup personnel need protection against this liquid's contact with the skin or eyes as well as inhalation of its vapor. Contain large spills and collect waste or absorb it with an inert material such as sand, earth, or vermiculite. Use nonsparking tools to place waste liquid or absorbent into closable containers for disposal. Keep waste out of sewers, watersheds, and waterways. **Waste Disposal:** Contact your supplier or a licensed contractor for detailed recommendations. Follow Federal, state, and local regulations.

**OSHA Designations**

Listed as an Air Contaminant (29 CFR 1910.1000 Subpart Z).

EPA Designations (40 CFR 302.4)

RCRA Hazardous Waste, NO. U080

CERCLA Hazardous Substance, Reportable Quantity: 1000 lbs (454 kg), per the Clean Water Act (CWA), § 307 (a), and the Resource Conservation and Recovery Act (RCRA), § 3001.

**SECTION 8. SPECIAL PROTECTION INFORMATION**

**Goggles:** Always wear protective eyeglasses or chemical safety goggles. Where splashing is possible, wear a full face shield. Follow OSHA eye- and face-protection regulations (29 CFR 1910.133). **Respirator:** Use a NIOSH-approved respirator per Genium reference 88 for the maximum-use concentrations and/or exposure limits cited in section 2. Follow OSHA respirator regulations (29 CFR 1910.134). For emergency or nonroutine operations (spills or cleaning reactor vessels and storage tanks), wear an SCBA. **Warning:** Air-purifying respirators will *not* protect workers in oxygen-deficient atmospheres. **Other:** Wear impervious neoprene, PVA, or Viton gloves, boots, aprons, and gauntlets, etc., to prevent any skin contact with liquid methylene chloride. **Ventilation:** Install and operate general and local maximum, explosion-proof ventilation systems powerful enough to maintain airborne levels of acetone below the exposure limits cited in section 2. Local exhaust ventilation is preferred because it prevents dispersion of the contaminant into the general work area by eliminating it at its source. Consult the latest edition of Genium reference 103 for detailed recommendations. Floor or sump ventilation may be necessary. **Safety Stations:** Make emergency eyewash stations, safety/quick-drench showers, and washing facilities available in work areas. **Contaminated Equipment:** Contact lenses pose a special hazard; soft lenses may absorb irritants, and all lenses concentrate them. Do *not* wear contact lenses in any work area. Remove contaminated clothing and launder it before wearing it again; clean this material from shoes and equipment. **Other:** Because the health effects of carbon monoxide and methylene chloride are additive (see sect. 6), workplaces should be equipped with automatic sensing equipment that identifies workroom atmospheric levels of both of these materials. **Comments:** Practice good personal hygiene; always wash thoroughly after using this material and before eating, drinking, smoking, using the toilet, or applying cosmetics. Keep it off your clothing and equipment. Avoid transferring it from your hands to your mouth while eating, drinking, or smoking. Do *not* eat, drink, or smoke in any work area. Do not inhale methylene chloride vapor.

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

**Storage/Segregation:** Store methylene chloride in closed, moisture-proof containers in a cool, dry, well-ventilated area away from sources of ignition, strong oxidizers, caustics, and incompatible chemicals (see sect. 5). Protect containers from physical damage.

**Special Handling/Storage:** Prevent moist air from entering storage containers. Provide ventilation at the floor level in storage areas because methylene chloride vapor is denser than air. Installation of a dryer and a safety seal on each tank is recommended. Aluminum is not recommended for use as a storage material; appropriate storage materials include galvanized iron, black iron, or steel. **Engineering**

**Controls:** Make sure all engineering systems (production, transportation) are of maximum explosion-proof design. Electrically ground and bond all containers and pipelines used in shipping, transferring, reacting, production, and sampling operations to prevent generating static sparks.

**Transportation Data (49 CFR 172.101-2)**

DOT Shipping Name: Dichloromethane or Methylene Chloride

DOT Hazard Class: ORM-A

ID No. UN1593

DOT Packaging Requirements: 49 CFR 173.605

DOT Packaging Exceptions: 49 CFR 173.505

IMO Shipping Name: Dichloromethane

IMO Hazard Class: 6.1

IMO Label: Saint Andrew's Cross (X)\*

IMDG Packaging Group: III

\*Harmful-Stow away from Foodstuffs.

References: 1, 26, 38, 84-94, 100, 116, 117, 120, 122.

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Prepared by PJ Iggoe, BS

Industrial Hygiene Review: DJ Wilson, CIH

Medical Review: MJ Hardies, MD

**Material Safety Data Sheet**  
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No. 303  
 METHYL ETHYL KETONE  
 (Revision C)  
 Issued: September 1979  
 Revised: March 1986

SECTION 1. MATERIAL IDENTIFICATION			20	
<b>MATERIAL NAME:</b> METHYL ETHYL KETONE <div style="float: right; text-align: center;"> </div>				
<b>OTHER DESIGNATIONS:</b> MEK, Butanone, 2-Butanone, Ethyl Methyl Ketone, CH <sub>3</sub> COCH <sub>2</sub> CH <sub>3</sub> , ASTM D740, CAS #0078-93-3 <div style="float: right; text-align: right;"> <b>HMIS</b>  H: 1  F: 3  R: 1  PPE*  *See sect. 8                             </div>				
<b>MANUFACTURER/SUPPLIER:</b> Available from many suppliers, including: Ashland Chemical Company, Industrial Chemicals & Solvents Div., PO Box 2219, Columbus, OH 43216; Telephone: (614) 889-3844				
SECTION 2. INGREDIENTS AND HAZARDS		%	HAZARD DATA	
Methyl Ethyl Ketone; (C <sub>4</sub> H <sub>8</sub> O)  * Current OSHA PEL and ACGIH (1985-86) TLV. NIOSH (1978) proposed a 10-hr TWA of 200 ppm.	ca 100	8-hr TWA 200 ppm* or 590 mg/m <sup>3</sup>  Human, Inhalation TCLo: 100 ppm/5 min.  Rat, Oral, LD <sub>50</sub> : 2.7 g/kg  Rabbit, Skin, LD <sub>50</sub> : 13 g/kg		
SECTION 3. PHYSICAL DATA				
Boiling Point, 1 atm ... 176°F (80°C) Vapor Pressure @ 20°C ... 72 Vapor Density (Air = 1) ... 2.5 Viscosity @ 25°C, cp ... 0.40 Solubility in Water @ 20°C, wt. % ... 27.1		Specific Gravity (20/4°C) ... 0.805 Volatiles, vol. % ... ca 100 Evaporation Rate (BuAc = 1) ... 5.7 Freezing Point ... -122.8°F (-86°C) Molecular Weight ... 72.12		
<b>Appearance and odor:</b> Colorless liquid with a moderately sharp, fragrant, mintlike odor. Unfatigued, odor recognition threshold (100% of test panel) is 6-10 ppm.				
SECTION 4. FIRE AND EXPLOSION DATA			LOWER	UPPER
Flash Point and Method	Autoignition Temp.	Flammability Limits In Air	1.8	10.0
20°F (-6.7°C) CC	960°F (516°C)	% by Vol.		
<b>EXTINGUISHING MEDIA:</b> Dry chemical, carbon dioxide, alcohol foam, water spray. Use water spray to disperse vapors and to flush spills away from exposures. A stream of water can scatter flames. Water may be ineffective in extinguishing fire but should be used to help control fire and keep fire-exposed containers cool. Methyl ethyl ketone is a dangerous fire hazard and a moderate explosion hazard when exposed to heat or flame. Vapors can flow along surfaces to a distant ignition source and flash back.				
Fire fighters should wear self-contained breathing apparatus in enclosed areas.				
SECTION 5. REACTIVITY DATA				
Methyl ethyl ketone is a stable material in closed containers at room temperature under normal storage and handling conditions. It does not polymerize.				
This material is an OSHA Class IB Flammable Liquid. It is incompatible with oxidizing agents that can cause spontaneous ignition and violent reaction. Ignition is caused by reaction with potassium t-butoxide.				
Thermal-oxidative degradation products can include carbon monoxide, carbon dioxide, and various hydrocarbons.				
MEK can attack many plastics, resins, and rubber.				

**SECTION 6. HEALTH HAZARD INFORMATION | TLV**

Methyl ethyl ketone is not listed as a carcinogen by the NTP, IARC, or OSHA. Inhalation of methyl ethyl ketone vapors can irritate the eyes, nose, and respiratory tract. Exposure to high concentrations will produce headache; dizziness; and, in extreme cases, unconsciousness. It can have a narcotic effect; however, its irritancy will often preclude exposure to narcotic concentrations. Prolonged or repeated skin contact may cause drying, cracking, irritation, and dermatitis. Eye contact may cause irritation and burning sensations. Ingestion can irritate the digestive tract; ingestion of several ounces can cause narcosis and acidosis.\*\*

**FIRST AID: SKIN CONTACT:** Wash area of contact with soap and water. Remove contaminated clothing immediately.

**EYE CONTACT:** Immediately wash with plenty of water, including under the eyelids. If irritation persists, get medical attention. **INHALATION:** Remove victim to fresh air. If required, restore breathing. Keep warm and at rest. Get immediate medical attention! **INGESTION:** If victim is conscious and medical help is not readily available, give him 3 glasses of water or milk to drink to induce vomiting. Get medical help as soon as possible\* with special attention to acidosis.\*\*

\* GET MEDICAL ASSISTANCE = In plant, paramedic, community. Get medical help for further treatment, observation, and support after first aid, if indicated.

\*\* P.G. Kopelman, "Severe Metabolic Acidosis After Ingestion of Butanone," *Brit. Med. J.* 286 (1986):21

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

Notify safety personnel and implement containment procedures. Remove all sources of heat or ignition. Provide optimum (explosion-proof) ventilation.

Cleanup personnel should use protection against inhalation of vapors and contact with liquid. Use foam to control vapors. Contain spills using absorbent material (dry sand or vermiculite). Use nonsparking tools. Mix well and place in appropriate container for disposal. Flush trace residues with much water. Do not flush to sewers or open waterways.

**DISPOSAL:** Waste may be burned in an approved incinerator or disposed of by a licensed disposal firm. Follow Federal, state, and local regulations.

EPA Hazardous Waste No. U159 (40 CFR 261); the primary hazardous properties of MEK are ignitability and toxicity (40 CFR 261.33).

**SECTION 8. SPECIAL PROTECTION INFORMATION**

Provide general and local exhaust fume ventilation to meet TLV requirements. Exhaust hoods should have a minimum velocity of 100 lfm (linear feet per minute). Exhaust fans and other electrical services must be of explosion-proof construction.

For emergency and nonroutine work above the TLV an approved, full-facepiece, organic-vapor, canister gas mask is recommended; but for unknown concentrations or those above or about 3000 ppm, self-contained or air-supplied respirators (positive pressure) are needed.

Use chemical safety goggles where liquid contact with the eyes is possible. Do not use contact lenses when working with solvents; soft lenses may absorb irritants and all lenses concentrate them. Use impervious gloves. Where splashing may occur, use a face shield, apron, and other protective clothing as needed to prevent skin contact. An eyewash station must be available near the workplace. A safety shower is desirable when large amounts of this material are used. Methyl n-butyl ketone has caused neurotoxic effects, and studies have shown that MEK may trigger these effects. (K. Saida, et al., *J. Neuropathology and Exp. Neurology* 35 [May 1976]: 207).

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

Store in a clean, cool, well-ventilated area away from heat, ignition, and oxidizing agents. Containers should be electrically interconnected and grounded for liquid transfers to prevent static sparks. Storage and use areas should be No Smoking areas. Use nonsparking tools. Small amounts should be handled in approved safety cans with proper labeling. Emptied containers may retain hazardous product residues (vapor or liquid). Electrical services must meet code requirements. Avoid skin and eye contact. Avoid breathing vapors. Do not ingest. Avoid contact with copper or copper-bearing materials. Wash thoroughly after handling.

**DOT Classification:** Flammable Liquid

**ID No.:** UN1193

**Label:** Flammable Liquid

**Data Source(s) Code:** 1-9, 12, 14, 19-21, 23, 26, 27, 34, 38, 47, 82, 84. CK

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**Approvals** Joseph O. Accrocco, 11/86.

**Indust. Hygiene/Safety** JHW 10-86

**Medical Review** [Signature] 86



# Material Safety Data Sheet

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GENIUM PUBLISHING CORP.

No. 304

METHYL ISOBUTYL KETONE  
(Revision C)

Issued: September 1979

Revised: March 1986

## SECTION 1. MATERIAL IDENTIFICATION

20

**MATERIAL NAME:** METHYL ISOBUTYL KETONE

**OTHER DESIGNATIONS:** MIBK, Hexone, 4-Methyl-2-pentanone, Methyl i-Butyl Ketone, Isobutyl Methyl Ketone,  $\text{CH}_3\text{COCH}_2\text{CH}(\text{CH}_3)_2$ , ASTM D1153, CAS #0108-10-1.

**MANUFACTURER/SUPPLIER:** Available from many suppliers, including:  
JT Baker, 222 Red School Lane, Phillipsburgh, NJ 08865; Telephone: (201) 859-2151

HMIS

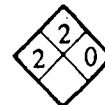
H: 1

F: 3

R: 0

PPE\*

\*See sect. 8



## SECTION 2. INGREDIENTS AND HAZARDS

%

### HAZARD DATA

Methyl Isobutyl Ketone ( $\text{C}_6\text{H}_{12}\text{O}$ )

ca 100

8-hr TWA 100 ppm\*  
or 410  $\text{mg}/\text{m}^3$

Human, Inhalation,  
TCLo: 200 ppm  
(Irritation)

Rat, Oral, LD<sub>50</sub>:  
2.08 g/kg

Rat, Inhalation,  
LCLo: 4000 ppm/15 min.

\* Current OSHA PEL. ACGIH (1985-86) TLV is 50 ppm or 205  $\text{mg}/\text{m}^3$ .

## SECTION 3. PHYSICAL DATA

Boiling Point, 1 atm ... 241°F (116°C)

Vapor Pressure @ 20°C, mm Hg ... 16

Vapor Density (Air = 1) ... 3.5

Solubility in Water @ 20°C, wt. % ... 1.91

Specific Gravity, 20/20°C ... 0.80

Volatiles, % ... ca 100

Evaporation Rate (BuAc = 1) ... 1.62

Melting Point ... -119°F (-84°C)

Molecular Weight ... 100.18

**Appearance and odor:** Colorless, mobile liquid with a sharp, mintlike odor. Unfatigued odor recognition threshold (100% test panel) is 0.3 to 0.5 ppm. Distinct odor at 15 ppm.

## SECTION 4. FIRE AND EXPLOSION DATA

LOWER UPPER

Flash Point and Method

Autoignition Temp.

Flammability Limits In Air

73°F (22.8°C) TCC

860°F (460°C)

% by Vol.

1.4

7.5

**EXTINGUISHING MEDIA:** Dry chemical, carbon dioxide, or foam. Use water with caution. Use water spray to cool fire-exposed containers and surrounding combustibles. Use of a solid stream of water can scatter and spread flames to other areas. (This material is lighter than water and only slightly soluble in water.)

Vapors are heavier than air and can flow along surfaces to distant ignition sources and flash back. Methyl isobutyl ketone is a flammable liquid that can form explosive mixtures with air when heated.

Fire fighters should use self-contained breathing apparatus and fully protective clothing.

## SECTION 5. REACTIVITY DATA

Methyl isobutyl ketone is a stable material in closed containers at room temperature under normal storage and handling conditions. It does not polymerize.

This material is an OSHA class IC flammable liquid. It is incompatible with strong oxidizing agents that can cause spontaneous ignition and violent reaction. It ignites on reaction with potassium t-butoxide.

It is a solvent capable of attacking some plastics, resins, and rubbers.

Products of thermal-oxidative degradation of this material can include carbon monoxide and carbon dioxide.

Measurement of its flash point is needed to classify this borderline material as either a class IB or a class IC flammable liquid.

**SECTION 6. HEALTH HAZARD INFORMATION | TLV**

Methyl isobutyl ketone is not listed as a carcinogen by the NTP, IARC, or OSHA. This material can irritate the eyes, respiratory tract, and skin. Exposure to high concentrations of this material may cause nausea, headaches, dizziness, and unconsciousness. Skin contact may cause defatting and irritation. Eye contact is irritating. Ingestion causes irritation and a burning sensation to the upper digestive tract. The material is a depressant of the central nervous system.

**FIRST AID:**

**EYE CONTACT:** Flush thoroughly with running water (including under eyelids) for 15 minutes.

**SKIN CONTACT:** Remove contaminated clothing. Wash affected area with soap and water.

**INHALATION:** Remove to fresh air.

**INGESTION:** Get medical help!\*

\* GET MEDICAL ASSISTANCE = In plant, paramedic, community. Seek medical assistance for further treatment, observation, and support, as indicated..

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

Notify safety personnel of major spills. Provide optimum explosion-proof ventilation. Remove sources of ignition. Provide cleanup personnel with protection against contact with liquid and inhalation of vapors.

Absorb small spills on paper and allow waste to evaporate in an exhaust hood. Contain large spills and absorb waste on vermiculite. Pick this up with a nonsparking scoop and place it in a closed metal container for disposal.

Spills can be flushed with water to remove material from a hazardous area; flush it to an open area or to the ground for evaporation. Prevent the discharge of waste into sewers, drains, and waterways.

**DISPOSAL:** Burn waste material in an approved incinerator. Follow Federal, state, and local regulations.

**SECTION 8. SPECIAL PROTECTION INFORMATION**

Provide general and exhaust ventilation to meet TLV requirements. Exhaust hoods should have a minimum face velocity of 100 fpm (linear feet per minute). Exhaust fans and other electrical services must be of explosion-proof construction. For emergency and nonroutine work above the TLV, an approved, full-facepiece, organic-vapor, canister gas mask is recommended; but for unknown concentrations or those above about 3000 ppm, self-contained or air-supplied respirators (positive pressure) are needed. Use safety goggles where liquid contact with the eyes is possible. Do not wear contact lenses when working with solvents. They pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them. Wear impervious gloves. Where splashing may occur, use a face shield, apron, and other protective clothing as needed to prevent skin contact.

- An eyewash station should be available near the workplace. A safety shower is desirable when large amounts are used. Medical surveillance of workers should include preplacement and (at least) annual examinations with attention to possible peripheral neuropathies. (*Lancet*, no. 8138 [August 18, 1979], p. 363.)

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

Store in tightly closed drums or metal safety cans in a cool, well-ventilated storage area away from ignition sources and oxidizing agents. Storage facility must be of the OSHA-approved type for class IC (or IB) liquids (see sect. 5). Prevent damage to containers.

Ground and bond metal containers when dispensing. Use only nonsparking tools near the solvent. No smoking in areas of storage or use.

Avoid prolonged or repeated contact with skin. Prevent eye contact.

**DOT Classification:** Flammable Liquid

**DOT ID No.:** UN1245

**Label:** Flammable Liquid

**Data Source(s) Code:** 2-4, 6-9, 12, 14, 19-21, 23, 26, 27, 38, 47, 82, 84. CK

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**Approvals** *JO. Accipoco, 11/86*

**Indust. Hygiene/Safety** *DW 10-86*

**Medical Review** *[Signature] Oct 86*

# Material Safety Data Sheet

Genium Publishing Corporation

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GENIUM PUBLISHING CORP.

No. 317

TOLUENE

(Revision D)

Issued: August 1979

Revised: April 1986

## SECTION 1. MATERIAL IDENTIFICATION

20

**MATERIAL NAME:** TOLUENE

**OTHER DESIGNATIONS:** Methyl Benzene, Methyl Benzol, Phenylmethane, Toluol, C<sub>7</sub>H<sub>8</sub>, CAS #0108-88-3

**MANUFACTURER/SUPPLIER:** Available from many suppliers, including:  
Allied Corp., PO Box 2064R, Morristown, NJ 07960; Telephone: (201) 455-4400  
Ashland Chemical Co., Industrial Chemicals & Solvents Div., PO Box 2219,  
Columbus, OH; Telephone: (614) 889-3844

HMIS

H: 2

F: 3

R: 0

PPE\*

\*See sect. 8



R 1

I 3

S 2

K 4

## SECTION 2. INGREDIENTS AND HAZARDS

%

### HAZARD DATA

Toluene



ca 100

8-hr TLV: 100 ppm, or  
375 mg/m<sup>3</sup>\* (Skin)\*\*

Man, Inhalation, TClO:  
100 ppm: Psychotropic\*\*\*

Rat, Oral, LD<sub>50</sub>: 5000 mg/kg

Rat, Inhalation, LCLo:  
4000 ppm/4 hrs.

Rabbit, Skin, LD<sub>50</sub>: 14 gm/kg

Human, Eye: 300 ppm

\* Current (1985-86) ACGIH TLV. The OSHA PEL is 200 ppm with an acceptable ceiling concentration of 300 ppm and an acceptable maximum peak of 500 ppm/10 minutes.

\*\* Skin designation indicates that toluene can be absorbed through intact skin and contribute to overall exposure.

\*\*\* Affects the mind.

## SECTION 3. PHYSICAL DATA

Boiling Point ... 231°F (111°C)

Vapor Pressure @ 20°C, mm Hg ... 22

Water Solubility @ 20°C, wt. % ... 0.05

Vapor Density (Air = 1) ... 3.14

Evaporation Rate (BuAc = 1) ... 2.24

Specific Gravity (H<sub>2</sub>O = 1) ... 0.866

Melting Point ... -139°F (-95°C)

Percent Volatile by Volume ... ca 100

Molecular Weight ... 92.15

**Appearance and odor:** Clear, colorless liquid with a characteristic aromatic odor. The odor is detectable to most individuals in the range of 10 to 15 ppm. Because olfactory fatigue occurs rapidly upon exposure to toluene, odor is not a good warning property.

## SECTION 4. FIRE AND EXPLOSION DATA

LOWER

UPPER

Flash Point and Method

Autoignition Temp.

Flammability Limits In Air

40°F (4°C) CC

896°F (480°C)

% by Volume

1.27

7.1

**EXTINGUISHING MEDIA:** Carbon dioxide, dry chemical, alcohol foam. Do not use a solid stream of water because the stream will scatter and spread the fire. Use water spray to cool tanks/containers that are exposed to fire and to disperse vapors.

**UNUSUAL FIRE/EXPLOSION HAZARDS:** This OSHA class IB flammable liquid is a dangerous fire hazard. It is a moderate fire hazard when exposed to oxidizers, heat, sparks, or open flame. Vapors are heavier than air and may travel a considerable distance to an ignition source and flash back.

**SPECIAL FIRE-FIGHTING PROCEDURES:** Fire fighters should wear self-contained breathing apparatus with full facepiece operated in a positive-pressure mode when fighting fires involving toluene.

## SECTION 5. REACTIVITY DATA

**CHEMICAL INCOMPATIBILITIES:** Toluene is stable in closed containers at room temperature under normal storage and handling conditions. It does not undergo hazardous polymerization. This material is incompatible with strong oxidizing agents, dinitrogen tetroxide, silver perchlorate, tetranitromethane, and uranium hexafluoride. Contact with these materials may cause fire or explosion. Nitric acid and toluene, especially in the presence of sulfuric acid, will produce nitrated compounds that are dangerously explosive.

**CONDITIONS TO AVOID:** Avoid exposure to sparks, open flame, hot surfaces, and all sources of heat and ignition. Toluene will attack some forms of plastics, rubber, and coatings. Thermal decomposition or burning produces carbon dioxide and/or carbon monoxide.

**SECTION 6. HEALTH HAZARD INFORMATION | TLV**

Toluene is not considered a carcinogen by the NTP, IARC, or OSHA. **SUMMARY OF RISKS:** Vapors of toluene may cause irritation of the eyes, nose, upper respiratory tract, and skin. Exposure to 200 ppm for 8 hours causes mild fatigue, weakness, confusion, lacrimation (tearing) and paresthesia (a sensation of prickling, tingling, or creeping on the skin that has no objective cause). Exposure to higher concentrations may cause headache, nausea, dizziness, dilated pupils, and euphoria, and, in severe cases, may cause unconsciousness and death. The liquid is irritating to the eyes and skin. Contact with the eyes may cause transient corneal damage, conjunctival irritation, and burns if not promptly removed. Repeated and/or prolonged contact with the skin may cause drying and cracking. It may be absorbed through the skin in toxic amounts. Ingestion causes irritation of the gastrointestinal tract and may cause effects resembling those from inhalation of the vapor. Chronic overexposure to toluene may cause reversible kidney and liver injury. **FIRST AID: EYE CONTACT:** Immediately flush eyes, including under eyelids, with running water for at least 15 minutes. Get medical attention if irritation persists.\* **SKIN CONTACT:** Immediately flush skin (for at least 15 minutes) while removing contaminated shoes and clothing. Wash exposed area with soap and water. Get medical attention if irritation persists or if a large area has been exposed.\* **INHALATION:** Remove victim to fresh air. Restore and/or support breathing as required. Keep victim warm and quiet. Get medical help.\* **INGESTION:** Give victim 1 to 2 glasses of water or milk. Contact a poison control center. Do not induce vomiting unless directed to do so. Transport victim to a medical facility. Never give anything by mouth to a person who is unconscious or convulsing. \* **GET MEDICAL ASSISTANCE =** In plant, paramedic, community. Get medical help for further treatment, observation, and support after first aid, if indicated.

**SECTION 7. SPILL, LEAK, AND DISPOSAL PROCEDURES**

**SPILL/LEAK:** Notify safety personnel of large spills or leaks. Remove all sources of heat and ignition. Provide maximum explosion-proof ventilation. Limit access to spill area to necessary personnel only. Remove leaking containers to safe place if feasible. Cleanup personnel need protection against contact with liquid and inhalation of vapor (see sect. 8). **WASTE DISPOSAL:** Absorb small spills with paper towel or vermiculite. Contain large spills and collect if feasible, or absorb with vermiculite or sand. Place waste solvent or absorbent into closed containers for disposal using nonsparking tools. Liquid can be flushed with water to an open holding area for handling. Do not flush to sewer, watershed, or waterway. **COMMENTS:** Place in suitable container for disposal by a licensed contractor or burn in an approved incinerator. Consider reclaiming by distillation. Contaminated absorbent can be buried in a sanitary landfill. Follow all Federal, state, and local regulations. TLm 96: 100-10 ppm. Toluene is designated as a hazardous waste by the EPA. The EPA (RCRA) HW No. is U220 (40 CFR 261). The reportable quantity (RQ) is 1000 lbs/454 kg (40 CFR 117).

**SECTION 8. SPECIAL PROTECTION INFORMATION**

Provide general and local exhaust ventilation to meet TLV requirements. Ventilation fans and other electrical service must be nonsparking and have an explosion-proof design. Exhaust hoods should have a face velocity of at least 100 lfm (linear feet per minute) and be designed to capture heavy vapor. For emergency or nonroutine exposures where the TLV may be exceeded, use an organic chemical cartridge respirator if concentration is less than 200 ppm and an approved canister gas mask or self-contained breathing apparatus with full facepiece if concentration is greater than 200 ppm. Safety glasses or splash goggles should be worn in all work areas. Neoprene gloves, apron, face shield, boots, and other appropriate protective clothing and equipment should be available and worn as necessary to prevent skin and eye contact. Remove contaminated clothing immediately and do not wear it until it has been properly laundered.

Eyewash stations and safety showers should be readily available in use and handling areas.

Contact lenses pose a special hazard; soft lenses may absorb irritants and all lenses concentrate them.

**SECTION 9. SPECIAL PRECAUTIONS AND COMMENTS**

**STORAGE SEGREGATION:** Store in a cool, dry, well-ventilated area away from oxidizing agents, heat, sparks, or open flame. Storage areas must meet OSHA requirements for class IB flammable liquids. Use metal safety cans for handling small amounts. Protect containers from physical damage. Use only with adequate ventilation. Avoid contact with eyes, skin, or clothing. Do not inhale or ingest. Use caution when handling this compound because it can be absorbed through intact skin in toxic amounts. **SPECIAL HANDLING/STORAGE:** Ground and bond metal containers and equipment to prevent static sparks when making transfers. Do not smoke in use or storage areas. Use nonsparking tools. **ENGINEERING CONTROLS:** Preplacement and periodic medical exams emphasizing the liver, kidneys, nervous system, lungs, heart, and blood should be provided. Workers exposed to concentrations greater than the action level (50 ppm) should be examined at least once a year. Use of alcohol can aggravate the toxic effects of toluene. **COMMENTS:** Emptied containers contain product residues. Handle accordingly! Toluene is designated as a hazardous substance by the EPA (40 CFR 116). DOT Classification: Flammable liquid. UN1294. Data Source(s) Code: 1-9, 12, 16, 20, 21, 24, 26, 34, 81, 82. CR

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Approvals *JO. Rocio, 11/86.*

Indust. Hygiene/Safety *DW 12-86*

Medical Review *DEF 86*

DATE: 3/88

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Toluene

A. Synonyms: Toluol, methyl benzene

B. CAS #: 108-88-37

II. Physical Characteristics

A. ☒ Liquid ☐ Solid ☐ Powder ☐ Gas

B. Color Colorless

C. Odor Benzene-like

D. LEL 1.3 % Flash Pt. 40°F

E. Boiling Point 231°F Melting Point -139°F

Ionization Potential 8.82 eV

F. Other \_\_\_\_\_

III. Recommended Air Purifying Cartridge:

☐ Dusts, Fumes, Mists

☐ Acid Gases

☒ Organic Vapors

☐ Pesticides

☐ HEPA

☐ Air Purifying is Inappropriate

☐ Ammonia/Amines

☐ Other \_\_\_\_\_

IV. Health Hazards Data

A. Routes of Entry: ☒ Inhalation ☒ Skin Absorption

☐ Ingestion

B. OSHA Listed Carcinogen: ☒ No ☐ Suspect ☐ Yes

C. Sensitizer: ☐ No ☒ No Data ☐ Suspect ☐ Yes

D. Acute Toxicity:

Eye Contact Irritant

Skin Contact Redness, drying of skin

Inhalation Headache, nausea, lassitude, intoxication, dilated pupils

E. Chronic Toxicity:

Target Organs Liver, CNS, skin

Long-Term Effects No conclusive data. Possibly liver damage.

V. Exposure Limits

A. OSHA PEL 200 ppm TWA, 300 ppm ceiling, 500 ppm 10-min peak

B. ACGIH TLV 100 ppm TWA

C. IDLH 2,000 ppm

D. NIOSH REL 100 ppm 10-hr TWA, 200 ppm 10-min ceiling

E. STEL 150 ppm (ACGIH)

VI. Other Pertinent Information/Special Precautions: \_\_\_\_\_

CHEMICAL DATA SHEET

I. Chemical/Compound Name: Chromium: soluble chromic and chromous salts

A. Synonyms: dependent upon specific compound chromous

B. CAS #: 7440-47-3

II. Physical Characteristics

A.      Liquid   X   Solid      Powder      Gas  
 B. Color Colorless - green-violet (dependent on compound)  
 C. Odor odorless  
 D. LEL                      % Flash Pt.                      °F  
 E. Boiling Point                      °F Melting Point                      °F  
 Ionization Potential                      eV  
 F. Other                     

III. Recommended Air Purifying Cartridge:

  X   Dusts, Fumes, Mists      Acid Gases  
     Organic Vapors      Pesticides  
  X   HEPA      Air Purifying is Inappropriate  
     Ammonia/Amines   X   Other SCES - at concentrations  
greater than 250 mg/m<sup>3</sup>  
(TWA)

IV. Health Hazards Data

A. Routes of Entry:      Inhalation   X   Skin Contact  
  X   Ingestion  
 B. OSHA Listed Carcinogen:   X   No      Suspect      Yes  
 C. Sensitizer:      No      No Data      Suspect   X   Yes  
 D. Acute Toxicity:  
 Eye Contact irritant  
 Skin Contact dermatitis  
 Inhalation                       
 E. Chronic Toxicity:  
 Target Organs skin  
 Long-Term Effects irritating and corrosive effect on  
tissue leading to ulcers

V. Exposure Limits   3    
 A. OSHA PEL 0.5 mg/m<sup>3</sup> (TWA)  
 B. ACGIH TLV 0.05 mg/m<sup>3</sup>  
 C. IDLH                       
 D. NIOSH REL 25 mg/m<sup>3</sup> (10 hr TWA), 50 mg/m<sup>3</sup> (15 min ceiling)  
 E. STEL                     

VI. Other Pertinent Information/Special Precautions:

### CHEMICAL DATA SHEET

I. Chemical/Compound Name: Manganese (dust and compounds)  
A. Synonyms: depends on specific compound  
B. CAS #: 7439-95-5

## II. Physical Characteristics

A.      Liquid   X   Solid      Powder      Gas  
B. Color   gray    
C. Odor                       
D. LCL                      % Flash Pt.                      °F  
E. Boiling Point   1806   °F Melting Point   2273   °F  
Ionization Potential                      eV  
F. Other                     

### III. Recommended Air Purifying Cartridge:

<u>X</u> Dusts, Fumes, Mists	___ Acid Gases
___ Organic Vapors	___ Pesticides
___ HEPA	___ Air Purifying is Inappropriate
___ Ammonia/Amines	___ Other _____

#### IV. Health Hazards Data

A. Routes of Entry: X Inhalation      Skin Absorption  
                                  X Ingestion  
B. OSHA Listed Carcinogen: X No      Suspect      Yes  
C. Sensitizer:      No X No Data      Suspect      Yes  
D. Acute Toxicity:  
Eye Contact      N/A

**Skin Contact** B/A

Inhalation. Malaise, fatigue, weakness in legs, dry throat, cough, tightness in chest, low-back pain, vomiting

E. Chronic Toxicity:  
Target Organs Respiratory system, CNS, Blood, kidneys  
Long-Term Effects Parkinson-like syndrome, metal fume  
fever, dyspnea, rales, symptoms simulate MS, ALS, pro-  
gressive Lenticular Degeneration, progressive bulbar  
paralysis, emotionally unstable

## V. Exposure Limits

A. OSHA PEL 5 mg/m<sup>3</sup> (TWA)  
B. ACGIH TLV 5 mg/m<sup>3</sup> (TWA): 1 mg/m<sup>3</sup> (Fume)  
C. IDLH 10,000 mg/m<sup>3</sup> (TWA)  
D. NIOSH REL 5 mg/m<sup>3</sup> (TWA)  
E. STEL

**VI. Other Pertinent Information/Special Precautions:** \_\_\_\_\_

## CHEMICAL DATA SHEET

I. Chemical/Compound Name: Lead, inorganic, as dust and fume  
A. Synonyms: Pb, solder, dross  
B. CAS #: 7439-92-1

### II. Physical Characteristics

A.      Liquid   X   Solid      Powder      Gas  
B. Color: Silvery to gray, depending upon oxidation  
C. Odor: Varies with compound  
D. LEL: Dust may be explosive Flash Pt. NA °F  
E. Boiling Point 3164° Melting Point 621° °F  
Ionization Potential NA eV  
F. Other     

### III. Recommended Air Purifying Cartridge:

<u>  X  </u> Dusts, Fumes, Mists	<u>    </u> Acid Gases
<u>    </u> Organic Vapors	<u>    </u> Pesticides
<u>  X  </u> HEPA	<u>    </u> Air Purifying is Inappropriate
<u>    </u> Ammonia/Amines	<u>  X  </u> Other <u>Higher concentrations</u> <u>may require supplied air</u>

### IV. Health Hazards Data

A. Routes of Entry:   X   Inhalation   X   Skin Absorption  
  X   Ingestion  
B. OSHA Listed Carcinogen:      No   X   Suspect      Yes  
C. Sensitizer:      No   X   No Data      Suspect      Yes  
D. Acute Toxicity:  
Eye Contact Dust is irritant  
Skin Contact Molten lead causes burns. Generally, in solid state lead causes no acute symptoms and a strong inhalation lassitude, insomnia, weakness, GI disturbances, colic.  
E. Chronic Toxicity:  
Target Organs CNS, blood, GI tract, kidneys, gingival tissue  
Long-Term Effects Anorexia, weight loss, constipation, pallor, neuro-muscular motor weakness, "wrist drop". A suspect carcinogen of the lungs and kidneys. An expectorant teratogen.

### V. Exposure Limits

A. OSHA PEL 0.05 mg/m<sup>3</sup> TWA  
B. ACGIH TLV 0.15 mg/m<sup>3</sup> TWA  
C. IDLH       
D. NIOSH REL Below 0.1 mg/m<sup>3</sup> 10-hour TWA  
E. STEL     

### VI. Other Pertinent Information/Special Precautions:



**ATTACHMENT 2**

**WCC HEALTH AND SAFETY ACCIDENT REPORT FORM**



- Corporate Health and Safety Administrator
- Corporate Health and Safety Officer
- Project Manager
- Personnel Office (medical treatment cases only)

**ATTACHMENT 3**

**SITE SAFETY OFFICER PRE-WORK CHECKLIST**



**ATTACHMENT 3**

**SITE SAFETY OFFICER PRE-WORK CHECKLIST**

1. Have you distributed the project Health and Safety Plan to all covered employees and allowed adequate time for review and clarification or resolution of concerns?  
\_\_\_ Yes \_\_\_ No
2. Are topics and issues discussed at the pre-work safety meeting documented in the project log book or on a safety meeting worksheet? \_\_\_ Yes \_\_\_ No
3. Have medical approval sheets, proper training documentation, and fit testing records for all covered employees been collected and filed at the jobsite?  
\_\_\_ Yes \_\_\_ No
4. Have the Safety Plan Compliance Agreement Forms been signed by all covered employees, collected, and forwarded to the business unit health and safety officer for filing? \_\_\_ Yes \_\_\_ No
5. Is all required personnel protective equipment (PPE) available in adequate supply on site? \_\_\_ Yes \_\_\_ No
6.
  - A) Is all required air monitoring equipment available in proper operating condition on site? \_\_\_ Yes \_\_\_ No
  - B) Is calibration gas for all air monitoring equipment available in adequate supply on site? \_\_\_ Yes \_\_\_ No
  - C) Is all air monitoring equipment properly calibrated and ready for use?  
\_\_\_ Yes \_\_\_ No
7. Are emergency service telephone numbers posted on site or readily available in the event of an emergency? \_\_\_ Yes \_\_\_ No
8. Is the emergency evacuation map posted on site or readily available if the need for site evacuation develops? \_\_\_ Yes \_\_\_ No \_\_\_ N/A

**ATTACHMENT 4**

**SITE SAFETY MEETING REPORT FORM**



## SITE SAFETY MEETING REPORT FORM

Project Number and Name: \_\_\_\_\_ Location: \_\_\_\_\_

Date and Time: \_\_\_\_\_ Activity: \_\_\_\_\_

Site Supervisor: \_\_\_\_\_ Site Health &amp; Safety Officer: \_\_\_\_\_

**EMERGENCY INFORMATION**

Hospital: \_\_\_\_\_ Location \_\_\_\_\_ Phone \_\_\_\_\_

Fire Department: \_\_\_\_\_ Location \_\_\_\_\_ Phone \_\_\_\_\_

Police: \_\_\_\_\_ Location \_\_\_\_\_ Phone \_\_\_\_\_

Ambulance: \_\_\_\_\_ Location \_\_\_\_\_ Phone \_\_\_\_\_

**ITEMS DISCUSSED:**

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**ATTENDEES:**

NAME (PRINTED)

SIGNATURE

DATE

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

**ATTACHMENT 5**

**EMERGENCY SERVICES/PHONE NUMBERS AND ROUTE TO THE HOSPITAL**



**ATTACHMENT 5****EMERGENCY SERVICES/PHONE NUMBERS AND ROUTE TO THE HOSPITAL**

The directions to the hospital are as follows:

Travel North on Cayce Road to Highway 72. Turn left on Highway 72 and travel North to Poplar Avenue (Memphis, Tennessee). Turn left on Poplar Avenue, travel approximately ten miles, hospital is on the left (7691 Poplar Avenue).

The list of emergency services must either be posted onsite or carried by all field personnel. Attachment 4 contains the following emergency information and directions to the hospital for posting purposes.

<b>Emergency Service</b>	<b>Location</b>	<b>Telephone</b>
Emergency Number	Holly Springs, Mississippi	601-851-7600
Fire Department	Holly Springs, Mississippi	601-851-7600
Police Department	Holly Springs, Mississippi	601-851-7600
Ambulance	Holly Springs, Mississippi	601-851-7600
Hospital	Memphis, Tennessee	901-754-6418
Poison Control Center	Holly Springs, Mississippi	601-851-7600
WCC Physician	Greaney Medical, Inc.	714-535-8221